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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,881

09/12/2005

Hiroaki Misawa

2005-0541A

7792

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7590

10/30/2006

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/529,881

Applicant(s)

MISAWA ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/12/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

- This Office Action is in response to applicant's preliminary amendment filed on April 1, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 4, and 6 and has newly added claims 8-20.
- Claims 1-20 remain pending in this application.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “**microscope**” recited in claims 7 and 20 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1-20 are objected to because of the following informalities:

(1). The phrase “photosensitive material capable of multi-photon exposure” recited in claims 1, 4, 8 and 9 is confusing and indefinite since it is not clear the limitations after the phrase “capable of” are or are not part of the claims. The recitation that an element is “capable of” performing certain function is not a positive limitation constitute a limitation in any patentable sense. In re Hutchison 69 USPQ 138.

(2) Claims 7 and 20 recite the phrase “an objective of a microscope” that is confusing and indefinite since the claims fail to give the structural relationship of this “microscope” with other elements recited in the claims and in their respective based claims. It is therefore not clear how to interpret this “microscope”.

(3). The phrase “a composition close to...” recited in claims 5, 10 and 11 is confusing and indefinite since what exactly is considered to be “close to” the formula stated in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 6-7, 12-13 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by the article “Femtosecond laser interference technique with diffractive beam splitter for fabrication of three-dimensional photonic crystals” by Kondo et al (Applied Physics Letters Volume 79 number 6).

Kondo et al teaches an *interference method* using *femtosecond* laser to create microperiodic structures in large volume, (please see the abstract), wherein an interference method is carried out by an

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interference recording system that is comprised of a *laser light source* for generating the *femtosecond laser pulse beam*, a *diffractive beam splitter* (DBS, Figure 1) for dividing the femtosecond laser pulse into a plurality of light beams, a *set of lenses* (L1 and L2) for *focusing divided light beams* and an *aperture* (AA) for selecting *four light beams* wherein the second lens L2 focus the four light beams onto a *photosensitive material* such that the interference pattern generated by the interference of the four beams is formed within the photosensitive material as a 1-D grating structure, (please see page 726, third paragraph). Knodo et al teaches that the interference method is to create *photonic crystal* whose refractive index is *periodically modulated*, (please see page 725, first paragraph). The 1-D grating structure, which is the interference pattern of the four beams, creates this periodic refractive index modulation of the photonic crystal, is essentially also a Bragg grating. This means the interference method is a holographic recording method for fabricating a photonic crystal with periodic refractive modulation in a form of 1-D grating, which is essentially a Bragg grating. The photonic crystal is theoretically a volume hologram in nature.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the photosensitive material for the recording is “*capable of*” multi-photo exposure with multi-photon absorption in the photosensitive material is induced. The features are claimed as a “*capability*” of the material which are not considered to be a positive limitations of the claims, (for the reasons stated above). However this reference teaches that the interference method can be applied to two-photon interference fabrication method, (please see page 727, second column lines 1-2), and since the photosensitive material used is capable of recreating photonic crystal as claimed, it is implicitly true that it has the capability of multi-photon exposure and multi-photon absorption.

With regard to claims 7 and 20, Kondo et al teaches that the first lens (L1) is an achromatic lens and the second lens (L2) is an objective lens which could be an objective lens for a microscope, (please see page 725 column 2, second paragraph and page 726, column 1, second paragraph lines 1-2).

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This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 4, 5, 8-11, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Femtosecond laser interference technique with diffractive beam splitter for fabrication of three-dimensional photonic crystals" by Kondo et al (Applied Physics Letters Volume 79 number 6) in view of the patent issued to Efimov et al. (PN. 6,586,141).**

The interference method using femtosecond laser to create microperiodic structures in large volume such as photonic crystal taught by **Kondo et al** as recited in the claim 1 has met all the limitations of the claims.

With regard to claims 4-5, and 8-11, Kondo et al does not teach explicit that the photosensitive material is a glass that undergoes photo/thermo-induced refractive index change having the composition close to the formula claimed in claims 5 and 10-11. **Efimov et al** in the same field of endeavor teaches a photo-thermo-refractive glass (PTR glass) having composition formula close to the one claimed in the claims (please see column 4, line 65 to column 5, line 19) that is suitable for recording high efficiency Bragg grating, (please see column 2, lines 30-51). It would then have been obvious to one skilled in the art to apply the teachings of Efimov et al to modify the interference method of Kondo et al to use the PTR glass as the photosensitive material for the benefit of creating and recording Bragg grating with high efficiency.

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With regard to claims 14-19, Kondo et al teaches that the interference method is carried out by an interference recording system that is comprised of *a laser light source* for generating the *femtosecond laser pulse beam*, a *diffractive beam splitter* (DBS, Figure 1) for dividing the femtosecond laser pulse into a plurality of light beams, a *set of lenses* (L1 and L2) for *focusing divided light beams* and an *aperture* (AA) for selecting *four light beams* wherein the second lens L2 focus the four light beams onto the *photosensitive material* such that the interference pattern generated by the interference of the four beams is formed within the photosensitive material.

Double Patenting

7. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

8. **Claims 1-5 and 8-11 are provisionally rejected under 35 U.S.C. 101** as claiming the same invention as that of claims 1-5 and 8-11 of **copending Application No. 11/106,520**. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided

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the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. **Claims 6-7 and 12-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting** as being unpatentable over claims 6-7 and 12-20 of **copending Application No. 11/106,520**. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim the method for 3D holographic recording using femtosecond laser source, diffraction beam splitter, two lenses and an aperture to select four beams from the laser source to create interference in the photosensitive material. Although the instant application does not teach to phase modulate the interfering beams however phase modulating interfering beams is rather common practice in the holographic recording system for modulating the recorded hologram or created photonic crystal in this case.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Contact Information

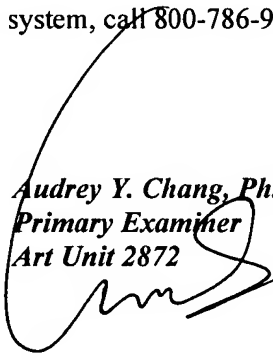
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.